120

120 CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Mama

Bend tube as per Dwg D412-664-243 using CNC bender program 412-aft and

Folio

D412-664-203/B92952

12-11-21

NCR:	Yes	/(No)
		\ /

WORK ORDER NON-CONFORMANCE / UPDATE

		7 -
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DOAShir	Date: .	~ s
7-1	12/12/12	↓ -

									QA Closed:	Date:	
Work Orde	r: 92	295	2		DISPOSITION			AGAINST DE	PARTMENT	/PROCESS	,
Part N	o. <u>D412</u>	2-66		03	Rework Scrap Use-as-is	l I	Skid-tube Machining moforming	Crosstube 🗲 Small Fab Finishing	1	Water Jet d. Eng. Coor. re/Packaging	Engineering Quality Other
NCR N	o. <u>12</u>	115.			Work Order Update	i nem	Large Fab	Composite	Rec/Stol	Supplier	J Other
Root				Descri	otion of work order update	Initial	Ac	tion	Sign &		
Cause	Date	Step	Qty	C	or Non-conformance	Chief Eng	hief Eng Description			Verification	QC Inspector
Doc/Data Equip/Tooling Operator	12/1/21	120	1	Tube toler	crushing is over	12/11/21	Acceptable attached	- per	313	(PAS 16 9-6	(PAS 16 8 8
Material Setup Other Process						12/11/21	attiched	S.R .	12/11/21	ızlulzı	12/11/21
Supplier					·						
Training Jnapproved	-										
Jiiapproved	1	I	<u>l</u>			L AULT CATE	GORY				
Landin	g Gear				General						
_	Bending				Bend	Grain		Γ.	Ovalized		Pressure/Forced
	Centre N	ot Concer	ntric to (o/s	BOM/Route	Hardwa	are		Over/Under	tolerance	Temperature/Cure
	Cracks				Broken/Damaged	Inspect	ion Incomplete		Part Incorre	ct	Weld
Ī	Crushed/	Crimped.			Burrs	Instruct	tions Incomplete/	'Unclear	Part Lost/Mi	issing	Wrong Stock Pulled
ſ	Cuffs				Contamination	Mainte	enance		Part Moved		_
	Heat Trea	at			Countersink	Mislabe	eled		Positioned V	Vrong	
Ī	Inspectio	n Strip in	Tube		Cut Too Short	Misrea	d		Power Loss/	Surge	Other
Γ	Ripples in	n Bend			Drill Holes	Offset		<u> </u>	-		
	Torque V	Vaves in E	xtrusion	۱ [Drawing	Out of Calibration					
	Turning S	Sequence			Finish	Out of Sequence					
	Wave/Tw	vist in Tub	e		Folio	Outside	Dimensions				

664-243

92952

Page 2

November-12-12 1:15:17 PM Item ID: D412-664-203 *N900040100* Accept Setup Start **Revision ID:** Item Name: Crosstube Aft Start Date: 12/11/2012 Start Oty: 1.00 **Cust Item ID: Required Date: 26/11/2012** Reg'd Qty: 1.00 **Customer:** Reference: Run Approvals: **Process Plan:** Date: Tooling: Date: Stop Date: SPC (Y/N): Date: Sequence ID/ Operation Tool ID Tool # Plan Reject Set Up/ Accept Reject Insp. Work Center ID Description Run Hours Code **Qty Qty** Number Stamp 130 QC15- Crosstube Dimensional Check *120* #5/W/CI OC 0.00 Memo Quality Control 140 0.00 Crosstubes *140* Crosstubes 0.00 Memo Crosstubes 1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551 and drill table DT8577 using #9 holes as per QSI 10 to install towers. 2-Ream hole to finish size in tube as per Dwg D412-664-243using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs. to ensure alignment with saddle holes. 3-SCRIBE PART # & BATCH # 12-11-21 4- *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-

												DQA:	Da	ate:	•
NCR:	Yes	/ No				WORK ORDER NON-	CO	NFOR	MANCE / UP	DATE			_		•
							•				_	QA Closed:	Da	ate:	· · · · · · · · · · · · · · · · · · ·
Work Ord	er.					DISPOSITION				AGAINST D	EF	PARTMENT	PROCESS		
Work Ord	···					Rework	7	:	Skid-tube	Crosstube	٦		Water Jet	:[Engineering
Part	۷o.					Scrap			Machining	Small Fab	Prod. Eng. Coor.				Quality
						Use-as-is	Thern	noforming	Finishing		Rec/Stor	e/Packaging		Other	
NCR	No.					Work Order Update		Large Fab Composite			Supplier				
Root	-		T		Descri	tion of work order update	Т	Initial Action			Т	Sign &			
Cause		Date	Step	Qty		or Non-conformance	Cr	nief Eng	Desc	cription		Date	Verification	n	QC Inspector
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Setup							'								
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		Bending				Bend	L	Grain				Ovalized			Pressure/Forced
Centre Not Concentric to O/S						BOM/Route	L	Hardwa	re			Over/Under	tolerance	L	Temperature/Cure
Cracks						Broken/Damaged		Inspecti	on Incomplete			Part Incorred	:t		Weld
Crushed/Crimped_						Burrs		Instruct	ions Incomplete/	'Unclear		Part Lost/Mi	ssing		Wrong Stock Pulled
		Cuffs				Contamination		Mainte	nance		Part Moved			_	
		Heat Trea	it			Countersink		Mislabe	led		Positioned Wrong			_	
		Inspection	n Strip in	Tube		Cut Too Short Misread				٦	Power Loss/S	Surge		Other	

Offset

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Torque Waves in Extrusion

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Outsource2

Outsource process - NDT

Page 3

November-12-12 1:15:17 PM Accept *N900040100* Item ID: D412-664-203 Setup Start **Revision ID:** Crosstube Aft Item Name: **Start Date:** 12/11/2012 Start Qty: 1.00 **Cust Item ID: Req'd Qty:** 1.00 **Required Date: 26/11/2012 Customer:** Reference: Run **Process Plan: Tooling:** Approvals: Date: Date: Stop SPC (Y/N): QC: Date: Date: Sequence ID/ Operation Set Up/ Tool ID Tool # Plan Accept Reject Reject Insp. Work Center ID **Description** Qty Run Hours Code **Qty** Number Stamp 160 QC5- Inspect part completeness to step on W/O *160* 12/4/22 QC 0.00 Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Quality Control 170 0.00 *170* HandFXtube 0.00 Memo Hand Finishing Crosstubes *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** I- CLEAN CROSSTUBE WITH WASH'N WIPE 180 Outsource process - NDT per OSI038 4.1 0.00 *180* 1112-11-22

0.00

Liquid Penetrant Inspection as per QSI 0380r Issue P/O: / Y/J/LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

NCR:	Yes / No				WORK ORDER NON-	COI	NFORN	MANCE / UPI	DATE			• •
	•	- · · · · · -						<u>, </u>		QA Closed:	Date	:
Work Orde	or.				DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
Part N					Rework Scrap			Skid-tube Machining	Crosstube Small Fab		Water Jet d. Eng. Coor.	Engineering Quality Other
NCR N	No	· · · · · · · · · · · · · · · · · · ·			Use-as-is Thermoforming Work Order Update Large Fab			Finishing Composite				
Root				Descri	ption of work order update	T	Initial	Act	ion	Sign &		
Cause	Date	Step	Qty		or Non-conformance	Ch	ief Eng	Descr	iption	Date	Verification	QC Inspector
Doc/Data												
Equip/Tooling									•			
Operator												
Material										<u> </u>		
Setup						-						
Other												
Process						1						
Supplier												
Training												
Unapproved		<u> </u>										
						AUL	T CATE	3ORY				
Landi	ng Gear			<u></u>	General		1		<u> </u>	1	<u> </u>	–
	Bending			.	Bend	\vdash	Grain			Ovalized		Pressure/Forced
	Centre No	ot Concei	ntric to (D/S	BOM/Route	<u> </u>	Hardwa			Over/Under	_	Temperature/Cure
Cracks					Broken/Damaged	\vdash	1 '	on Incomplete		Part Incorre	<u></u>	Weld
Crushed/Crimped.					Burrs	\vdash	1	ions Incomplete/U	Jnclear	Part Lost/M	ssing	Wrong Stock Pulled
Cuffs					Contamination	<u> </u>	Mainte		<u> </u>	Part Moved		
Heat Treat					Countersink	├──- 1			<u> </u>	Positioned V		¬
	Inspectio		Tube		Cut Too Short	<u> </u>	Misread			Power Loss/	Surge	Other
Ripples in Bend					Drill Holes	Offset						
Torque Waves in Extrusion					Drawing	1	Out of C	alibration				

Out of Sequence
Outside Dimensions

Date:

Turning Sequence

Wave/Twist in Tube

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

92952

November-12-12 1:15:17 PM

Required Date: 26/11/2012

Item ID:

D412-664-203

Accept

N900040100

Setup Start

NC1

Revision ID:

Item Name: Start Date: Crosstube Aft

12/11/2012 Start Qty: 1.00

Req'd Qty: 1.00

1

Cust Item ID:

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

0.00

Date:

Run Star

Qty

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop *NI

Sequence ID/ Work Center ID Operation
 Description

Set Up/ Run Hours Tool ID

Tool # Plan Code Accept Qty Reject Reject

Reject Insp. Number Stamp

190

190

Packaging

Packaging Packaging **Memo** 0.00

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

Inspect for transit damage

Ensure copy of NDT results attached to work order.

DL .

200

QC5- Inspect part completeness to step on W/O

0.00

0.00

Quality Control

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

Inspect for damage & ensure results are as per Dwg D412-664-203

203

203

HandFXtube
Hand Finishing Crosstubes

Memo

Memo

0.00

0.00

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

1- PRESSURE WASH AND THEN USE WASH'N WIPE TO CLEAN CROSSTUBE BEFORE CHEMICAL CONVERSION

770-

1 0 0

13-11-33 WB_____BU

NCR:	Yes	/	No

WORK ORDER NON-CONFORMANCE / UPDATE

DQA	Ĭ.,
13/12/12	
A Closed: Date: /	:

QA Closed: — Date:												
Work Ord	er:	92	952	2		DISPOSITION	/		AGAINST DE	PARTMENT	/PROCESS	· · · · · · · · · · · · · · · · · · ·
Part I	vo. <u>I</u>		-66	4-2	03 	Rework Scrap Use-as-is Work Order Update	Scrap Machining Small Fab Use-as-is Thermoforming Finishing Work Order Update Large Fab Composite				Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other
Root					Descri	ption of work order update	Initial	Ac	tion	Sign &		
Cause		Date	Step	Qty	(or Non-conformance	Chief En	g Desc	ription	Date	Verification	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training Unapproved	17	_{2/4} /22	190	٦		minor inodins by NDT @		TORING OU INDICATED by N-REWST INSPE		MO 12/11/23	LS/II/SS	1214/22
						F.A	ULT CAT	EGORY				
Landi	ng Gea	ar				General						
	Ce	ending entre Not racks	t Concen	tric to (o/s	Bend BOM/Route Broken/Damaged	Grain Hardv Inspec			Ovalized Over/Under Part Incorred	Pressure/Forced Temperature/Cure Weld	
	Crushed/Crimped. Cuffs					Burrs Contamination	Main	ctions Incomplete/I tenance	Unclear	Part Lost/Mi Part Moved		Wrong Stock Pulled
	Heat Treat					Countersink	Mislal			Positioned W		,
	Inspection Strip in Tube					Cut Too Short	Misre			Power Loss/S		Other
						Drill Holes	Offset			, ,	•	n Are unabe
					` _	Drawing	Out of Calibration by he seen by a			must inspecting		
						Finish	_	Sequence		here Q	Dort.	
Wave/Twist in Tube						Folio	Outside Dimensions					

92952

Page 5

November-12-12 1:15:17 PM

Item ID:

D412-664-203

Accept

N900040100

Setup Start

Revision ID:

Item Name: **Start Date:**

Crosstube Aft 12/11/2012

1

Cust Item ID:

Required Date: 26/11/2012 'Req'd Qty: 1.00

Start Qty: 1.00

1

Customer:

Reference: , **

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Stop

QC:

Date:

SPC (Y/N):

Date:

Sequence ID/ **Work Center ID**

Operation Description

Set Up/ Run Hours Tool ID

Tool #

Plan Accept Code Qty

Reject Qty

Reject Number Stamp

Insp.

205

205 QC

Quality Control

QC7-Inspect Chemical Conversion Coat

0.00

Memo

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

												DQA:	Date:	
NCR:	Yes	/ No					WORK ORDER NON-C	COI	NFORI	MANCE / UPI	DATE			
												QA Closed:	Date:	
Work Ord	er:						DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
Part							Rework Scrap		1	Skid-tube Machining	Crosstube Small Fab	-	Water Jet d. Eng. Coor.	Engineering Quality
NCR	No.						• — •			noforming Large Fab	Finishing Composite	Rec/Stoi	re/Packaging Supplier	Other
Root					Desc	crip	otion of work order update		Initial Action			Sign &		
Cause		Date	Step	Qty		or Non-conformance			Chief Eng Description			Date	Verification	QC Inspector
oc/Data quip/Tooling perator Material etup other rocess upplier raining														
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Land	ng (Gear			_		General					_		
	Bending Centre Not Concentric to O/S Cracks Crushed/Crimped Cuffs Heat Treat Inspection Strip in Tube Ripples in Bend						Bend BOM/Route Broken/Damaged Burrs Contamination Countersink Cut Too Short Drill Holes		Grain Hardware Inspection Incomplete Instructions Incomplete/Unclear Maintenance Mislabeled Misread			Ovalized Over/Under Part Incorred Part Lost/Mi Part Moved Positioned V Power Loss/	ct ssing	Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled Other
	\vdash	Torque W		xtrusio	, }	_	Drawing	Offset Out of Calibration			-			
		Turning Se		AC 43101	·		Finish	Out of Sequence						

Outside Dimensions

Wave/Twist in Tube

Page 6

November-12-12 1:15:17 PM

Required Date: 26/11/2012

Item ID:

D412-664-203

Accept

N900040100

Setup Start

Revision ID:

Item Name: **Start Date:**

Crosstube Aft 12/11/2012

Start Qty: 1.00

Cust Item ID:

Customer:

Tool ID

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Date:

Req'd Qty: 1.00

SPC (Y/N):

0.00

0.00

Date:

Stop

Sequence ID/ Work Center ID Operation Description Set Up/ **Run Hours**

Tool #

Plan Accept Code Qty

Reject Qtv

Reject Insp. Number

Stamp

210

Spray Painting

210

SprayPaint SprayPaint

QC:

Memo

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per DEO D412-664-243 and QSI 005 4.2

PRIME: | 22888

Start Time: 3:00 Fininsh Time: 8:45
PAINT: 123591

Start Time: 6:30

Finish Time: 7:00

Clear 121625
3- Apply clear coat after paint as per DEO

12-11-28

^{***}Mask underside of crosstube as shown***

										DQA:	Date	· · · · · · · · · · · · · · · · · · ·
NCR:	Yes /	' No				WORK ORDER NON-	CONFOR	MANCE / UPD	ATE			
									.	QA Closed:	Date	:
Work Ord	er.					DISPOSITION			AGAINST DE	PARTMENT	/PROCESS	
WOIR OIG	··· —	· · · · · · · · · · · · · · · · · · ·		,		Rework	7	Skid-tube	Crosstube	1	Water Jet	Engineering
Part I	No.					Scrap	-	Machining	Small Fab	Pro	d. Eng. Coor.	Quality
									Finishing	4	re/Packaging	Other
NCR I	No.					Work Order Update		Large Fab	Composite		Supplier	1 1
					•					_	-	
Root						ption of work order update	Initial	Actio	on	Sign &		
Cause		Date	Step	Qty	(or Non-conformance	Chief Eng	Descri	ption	Date	Verification	QC Inspector
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quip/Tooling	\vdash											
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/laterial	Н		1					1				
etup	Н		,				3					
Other	Н						3.					
rocess	Н											
upplier raining	Н	ı										ŀ
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Landi	ng Gea	ar				General						
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	Centre Not Concentric to O/S					BOM/Route	Hardwa	are		Over/Under	tolerance	Temperature/Cure
	Cracks					Broken/Damaged	Inspect	ion Incomplete		Part Incorred	ct [Weld
	Crushed/Crimped.							tions Incomplete/Ur	nclear	Part Lost/Mi	ssing	Wrong Stock Pulled
	Cu	ıffs				Contamination	Maintenance			Part Moved		
	H∈	eat Trea	t		1	Countersink	Mislabe	eled		Positioned V	Vrong	

Misread

Out of Calibration

Outside Dimensions

Out of Sequence

Offset

Positioned Wrong

Power Loss/Surge

Other

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Inspection Strip in Tube

Torque Waves in Extrusion

Cut Too Short

Drill Holes

Drawing

Finish

Work Order ID 92952

November-12-12 1:15:17 PM

92952

Item ID: D412-664-203 Accept *N900040100* Setup Start **Revision ID:** Crosstube Aft Item Name: **Start Date:** 12/11/2012 Start Qty: 1.00 **Cust Item ID: Required Date:** 26/11/2012 Req'd Qty: 1.00 **Customer:** Reference: Run **Process Plan: Approvals:** Date: **Tooling:** Date: Stop QC: Date: SPC (Y/N): Date: Sequence ID/ Operation Tool ID Tool # Reject Set Up/ Plan Accept Reject Insp. Work Center ID Description Qty **Run Hours** Code Qty Number Stamp 220 QC14- Inspect Spray Paint 0.00 *220* QC Memo Quality Control Then, Wrap in plastic bag to protect from scratches 230 0.00 Crosstubes *230* Crosstubes 0.00 Memo Crosstubes Assemble as per Dwg D412-664-203

1- Install chafing shield as per DEO D412-664-243. Top holes should be facing up.

A/R Proseal 890 Batch: 123831 EXP: 5/13

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3-Install support with Scotch-Weld DP460 and install clamps as per DEO Dwg D12-664-243 using installation jig DT9024. Torque clamps as per dwg A/R Scotch-Weld DP460 Batch: 122900

										DQA:	Date:		
NCR: Ye	es / No				WORK ORDER NON-C	CON	QA Closed:	Date:	•				
Work Order	r:				DISPOSITION				AGAINST DE	PARTMENT	/PROCESS		
Part No					Rework Scrap Use-as-is Work Order Update		I Therm	Skid-tube Crosstube Small Fab Finishing Composite		4	Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other	
Root				Descri	ption of work order update	In	nitial	Ac	tion	Sign &		· -	•
Cause	Date	Step	Qty	(or Non-conformance	Chie	ef Eng	Desc	ription	Date	Verification	QC Inspector	
Doc/Data													
quip/Tooling													
Operator													
Material													
Setup						<u> </u>							
Other	1]				1	· .						

nding Gear		General						 _
	Bending		Bend		Grain		Ovalized	Pressure/Forced
	Centre Not Concentric to O/S		BOM/Route		Hardware		Over/Under tolerance	Temperature/Cure
	Cracks		Broken/Damaged		Inspection Incomplete		Part Incorrect	Weld
	Crushed/Crimped.		Burrs		Instructions Incomplete/Unclear		Part Lost/Missing	Wrong Stock Pulled
	Cuffs		Contamination		Maintenance		Part Moved	
	Heat Treat		Countersink		Mislabeled		Positioned Wrong	 _
	Inspection Strip in Tube		Cut Too Short		Misread		Power Loss/Surge	Other
	Ripples in Bend		Drill Holes		Offset			-
	Torque Waves in Extrusion		Drawing		Out of Calibration			
	Turning Sequence		Finish		Out of Sequence			
	Wave/Twist in Tube		Folio		Outside Dimensions			

FAULT CATEGORY

Process
Supplier
Training
Unapproved

*November-12-12 1:15:17 PM

Quality Control

Item ID: D412-664-203 Accept *N900040100* Setup Start **Revision ID:** Crosstube Aft Item Name: **Start Date:** 12/11/2012 Start Qty: 1.00 **Cust Item 1D: Required Date: 26/11/2012** Req'd Qty: 1.00 **Customer:** Reference: Run Approvals: **Process Plan:** Date: **Tooling:** Date: QC: Date: SPC (Y/N): Date: Sequence ID/ Set Up/ Operation Reject Tool ID Tool # Plan Accept Reject Insp. Work Center ID Description Code Qty **Run Hours** Qty Number Stamp 240 QC5- Inspect part completeness to step on W/O 0.00 *240* 0.00 Memo Quality Control 250 Pick Kit 0.00 *250* Packaging 0.00 Memo Packaging 260 QC4-100% Inspect kits for completeness *260* QC Memo

											DQA:	Date:		
NCR:	Yes	/ No				WORK ORDER NON-	COI	NFOR	MANCE / UP	DATE			•	
											QA Closed:	Date:	•	
Work Ord	er:					DISPOSITION AGAINST D					EPARTMENT/PROCESS			
Part No						Rework Scrap Use-as-is Work Order Update	Machining Small Fab Thermoforming Finishing			Crosstube Small Fab Finishing Composite	Water Jet Prod. Eng. Coor. Rec/Store/Packaging Supplier		Engineering Quality Other	
Root				l	Descri	ption of work order update		nitial	Act	tion	Sign &	T		
Cause		Date	Step	Qty	1	or Non-conformance	Ch	ief Eng	Desci	ription	Date	Verification	QC Inspector	
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		Bending				Bend		Grain			Ovalized		Pressure/Forced	
	Centre Not Concentric to O/S BOM/Route					Hardware				Over/Under	tolerance	Temperature/Cure		
	├ ─┤					Broken/Damaged		Inspect	on Incomplete		Part Incorre	ct	Weld	

Instructions Incomplete/Unclear

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread

Offset

Part Lost/Missing

Positioned Wrong

Power Loss/Surge

Part Moved

Wrong Stock Pulled

Other

Ripples in Bend

Turning Sequence

Wave/Twist in Tube

Crushed/Crimped.

Inspection Strip in Tube

Torque Waves in Extrusion

Cuffs

Heat Treat

Burrs

Contamination

Countersink

Cut Too Short

Drill Holes

Drawing

Finish

92952

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*November-12-12 1:15:17 PM Item ID: D412-664-203 Accept *N900040100* Setup Start **Revision ID:** Crosstube Aft Item Name: Start Qty: 1.00 **Start Date:** 12/11/2012 **Cust Item ID: Required Date: 26/11/2012** Req'd Qty: 1.00 **Customer:** Reference: Run **Process Plan: Approvals:** Date: Tooling: Date: QC: SPC (Y/N): Date: Date: Sequence ID/ Reject **Operation** Tool ID Tool # Plan Accept Reject Set Up/ Work Center ID Description Code Qty Qty **Run Hours** Number 270 0.00 Packaging *270* Packaging 0.00 Memo Packaging Identify and pack for shipping as per PPP D412-664-203 ******Ensure tube is not packaged if curing time is less than 12 hrs, see step 27

for application time & date ******

Time & date of packaging:

Location: FG 183

280

QC21- Final Inspection - Work Order Release

0.00

Quality Control

Memo

0.00

MLJ 12-12-05

Insp.

Stamp

												DQA:	Da	ite:	
NCR:	Yes	/ No				WORK ORDER NON-C	OI	NFORI	MANCE / UP	DATE					•
											QA CI	osed:	Da	ite:	•
Work Ord	er.					DISPOSITION				AGAINST DEPARTMENT/PROCESS					,
Work Ora	٠		<u></u>			Rework]		Skid-tube	Crosstube]		Water Jet	Γ	Engineering
Part I	No.					Scrap	-					Quality			
					Use-as-is		I	noforming	Finishing	Re		re/Packaging		Other	
NCR No.			Work Order Update		,	Large Fab	Composite			Supplier					
											,		<u>,</u>		
Root					· •	ption of work order update	t	Initial		tion	Sigr		_		
Cause	_	Date	Step	Qty	C	or Non-conformance	Ch	nief Eng	Desc	ription	Da	te	Verificatio	n	QC Inspector
Doc/Data	Ш														
Equip/Tooling	Щ														
Operator	Щ														
Material	Ш														
Setup															
Other	Ш			,											
Process															
Supplier	Ш			į											
Training	Ш														
Unapproved															
							\UL	T CATE	GORY						
Landi					_	General		1			1	,		_	1
	\vdash	Bending				Bend		Grain			Ovaliz				Pressure/Forced
					BOM/Route		Hardwa	re		Over/l	Jnder	tolerance		Temperature/Cure	
	Cracks Broken/Damag				Broken/Damaged		Inspecti	on Incomplete		Part In	corre	ct		Weld	
Crushed/Crimped. Burrs				Burrs		Instruct	ions Incomplete/	Unclear	Part Lo	ost/Mi	ssing		Wrong Stock Pulled		
Cuffs				Contamination		Mainte	nance		Part M	loved					
		Heat Trea	t			Countersink		Mislabe	led		Positioned Wrong				
				Cut Too Short	Misread			Power	Loss/	Surge		Other			

Offset

Out of Calibration

Out of Sequence

Outside Dimensions

Ripples in Bend

Turning Sequence

Wave/Twist in Tube

Torque Waves in Extrusion

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Picklist Print

November-12-12 1:15:21 PM

Work Order ID: 92952

D412-664-203

92952

D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 12/11/2012

Required Date: 26/11/2012

Page 1

Start Qty: 1.00

**

Required Qty: 1.00

Comments:

Parent Item:

IPP Rev:E04.02.16Reformat: Added D3189-1K/DS

Remove Coments on Pick List JLM IPP Rev:F 06-03-29 IPP Rev:G 06.12.08 per ECN 886 EC IPP Rev:H 07-04-30 As per Rev D JLM

Manufactured

IPP Rev:1 08-06-12 add comment in seq. 21 DD verified by:EC IPP rev J

11.04.21 DEO D412-664-243-E-1 EC verified DD

IPP REV:K

11.10.03 DEO D412-664-243-E-2 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Status Issued
D412-664-203TRN *D412-664	L-203TE	Manufactured	No	B9178	0	110	Each	6.0000	**	1	AW	12-11-20
Crosstube Turning Detail	/ (/, /	VI V							, ee -			

	Location	Loc Q	<u>ty</u>	Loc Code		
	LG		6			
	83835		1			
	87158		1			
	90960		1			
	90961		1			
	91765		1			
	91778		1			
lo		230	Each	32.0000	1	1

Support

D2896-1

Location	Loc Oty	Loc Code	
LG053	32		
74465	8		
86663	12		
88695	12		(1)_

											DQA:	Date:	·	
Yes	/ No					WORK ORDER NON-C	O	NFOR	MANCE / UPD	DATE			•	
											QA Closed:	Date:	•	
er:						DISPOSITION				AGAINST DI	DEPARTMENT/PROCESS			
Part No.					Rework Skid-tube Scrap Machining Use-as-is Thermoforming Work Order Update Large Fab			Machining noforming	Crosstube Small Fab Finishing Composite		-	Engineering Quality Other		
				Desc	crip	otion of work order update		Initial	Acti	ion	Sign &			
	Date	Step	Qty		0	r Non-conformance	Ch	ief Eng	Descri	iption	Date	Verification	QC Inspector	
		·				-								
						F.	١UL	T CATE	GORY					
ng (Gear			-		General		1			_			
	Cracks Crushed/C Cuffs Heat Trea Inspectior Ripples in Torque W	Crimped. t n Strip in Bend laves in E	Tube	- - - -		BOM/Route Broken/Damaged Burrs Contamination Countersink Cut Too Short Drill Holes		Inspecti Instruct Mainte Mislabe Misread Offset Out of C	on Incomplete ons Incomplete/U nance led	nclear	Part Incorred Part Lost/Mi Part Moved Positioned V	ssing Vrong	Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled Other	
	er: No.	er:	er: No. Date Step Date Step Bending Centre Not Concer Cracks Crushed/Crimped Cuffs Heat Treat Inspection Strip in Ripples in Bend	er: No. Date Step Qty Date Step Qty Bending Centre Not Concentric to C Cracks Crushed/Crimped Cuffs Heat Treat Inspection Strip in Tube Ripples in Bend Torque Waves in Extrusion	er: No. Date Step Qty Date Step Qty Bending Centre Not Concentric to O/S Cracks Crushed/Crimped Cuffs Heat Treat Inspection Strip in Tube Ripples in Bend Torque Waves in Extrusion	er: No. No. Date Step Qty O Description Date Step Qty O Cracks Crushed/Crimped. Cuffs Heat Treat Inspection Strip in Tube Ripples in Bend Torque Waves in Extrusion	er: No. Rework Scrap Use-as-is Work Order Update Date Step Qty Description of work order update or Non-conformance I be a step Qty Description of work order update or Non-conformance I be a step Qty Bend Countersink Countersink Countersink Inspection Strip in Tube Cut Too Short Bipples in Bend Drill Holes Drawing Drawing Drawing I be a structured Drawing Dra	er: No. Rework Scrap Use-as-is Work Order Update	er:	er: No.	Principle of the princi	WORK ORDER NON-CONFORMANCE / UPDATE OA Closed: Pro Skid-tube	WORK ORDER NON-CONFORMANCE / UPDATE QA Closed: Date ORDER DISPOSITION Rework Skid-tube Crosstube Machining Small Fab Prod. Eng. Coor. Thermoforming Large Fab Composite Supplier Date Step Qty Description of work order update Date Step Qty Or Non-conformance Chief Eng Description Date Verification Date Step Qty Or Non-conformance Chief Eng Description Date Verification FAULT CATEGORY Rec/Store/Packaging Supplier Chief Eng Description Date Verification Date Step Qty Or Non-conformance Chief Eng Description Date Verification FAULT CATEGORY Rec/Store/Packaging Description Date Verification Rec/Store/Packaging Description Date Verification FAULT CATEGORY Rec/Store/Packaging Rec/Store/Packaging Rec/Store/Packaging Description Rec/Store/Packaging Rec/Sto	

Outside Dimensions

Wave/Twist in Tube

Page 2

Picklist Print

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November-12-12 1:15:21 PM

Work Order ID: 92952

92952

Parent Item:

D412-664-203

D412-664-203

Parent Item Name: Crosstube Aft **Start Date: 12/11/2012 Required Date: 26/11/2012** Start Qty: 1.00 Required Qty: 1.00 D3189-1 No 230 14.0000 Manufactured Each Al 12-12-2 *D3189-1* ** (2)Chafing Shield(send DSI9629 with spares) 91673 Loc Qty Loc Code LG053 14 89901 14 D3595-063-570 230 89.0000 Manufactured No Each Al 12-12-2 ** RUBBER CUSHION Location Loc Qty Loc Code FG 37971 42243 LG 76 83294 76 MAT052 71534 76546 MS21920-28 No 230 55.0000 Purchased Each ** (4) Clamp(per MIL-DTL-8783C) 123674 Location Loc Qty Loc Code FG 5 105884 5 LG050 10 118713 120054 122518 LG051 40 121440 122204 10 123243 22

Shop Packet Print

											DQA:	Da	ite:	
NCR:	Yes	/ No				WORK ORDER NON-	CO	NFOR	MANCE / UP	DATE				•
											QA Closed	: Da	ite:	•
Work Ord	er.					DISPOSITION				AGAINST DE	AGAINST DEPARTMENT/PROCESS			
Work Ord	٠					Rework	1	İ	Skid-tube	Crosstube	1	Water Jet		Engineering
Part I	No.					Scrap	1		Machining	Small Fab	Pro	d. Eng. Coor.		Quality
				Use-as-is	1	Thern	noforming	Finishing	-	re/Packaging		Other		
NCR No.				Work Order Update]		Large Fab	Composite		Supplier				
								<u> </u>			T	1		,
Root	İ	_				ption of work order update	1	Initial	j	tion	Sign &			
Cause		Date	Step	Qty		or Non-conformance	Cr	nief Eng	Desc	ription	Date	Verificatio	<u>n</u>	QC Inspector
Doc/Data														
Equip/Tooling	Щ													
Operator	Щ													
Material	Щ													
Setup	Щ													
Other	Щ													
Process	Ш					•						1		
Supplier	Ш										'			
Training							ľ							
Unapproved														<u> </u>
							AUL	T CATE	GORY					
Landi						General		1		Γ	٦			٦
		Bending				Bend	<u> </u>	Grain		<u> </u>	Ovalized		<u>_</u>	Pressure/Forced
	Centre Not Concentric to O/S BOM/Route					<u> </u>	Hardwa			Over/Under		\vdash	Temperature/Cure	
Cracks Broken/Damaged						ł i	on Incomplete		Part Incorre		<u></u>	Weld		
Crushed/Crimped. Burrs						1	ions Incomplete/	Unclear	Part Lost/M	_	L	Wrong Stock Pulled		
Cuffs Contamination					Contamination	Maintenance				Part Moved				
	Heat Treat Countersink				Mislabeled			<u> </u>	Positioned Wrong					
	Inspection Strip in Tube Cut Too Short					Misread			Power Loss,	/Surge	L	Other		

Offset

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Torque Waves in Extrusion

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Picklist Print

November-12-12 1:15:21 PM

Work Order ID: 92952

Parent Item:

D412-664-203

Parent Item Name: Crosstube Aft

92952

D412-664-203

Start Date: 12/11/2012

Start Qty: 1.00

Required Date: 26/11/2012

Required Qty: 1.00

MS21920-30

MS21920-30 clamp(per MIL-DTL-8783C)

Purchased

Purchased

Purchased

No

No

No

230

Each

99.0000

Loc Code

**

12-12-2

Location	<u>La</u>	oc Qty
LG		7
119529		7
LG050		50
123240		50
LG051		42
111258		14
121583		28
_	250	Each

76.0000







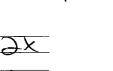
AN6-41A

AN6-40A

Locatio	<u>n</u>	Loc	<u>Oty</u>	Loc Code
ST340			70	
	122416		20	
	123021		50	
ST342			6	
	120833		4	
	121827		2	
		250	Each	58.0000

Loc Code Location Loc Qty ST340 32 32 122407

51341		25
	123522	25
ST342		1
	121825	1



NCR:	NCR: Yes / No WORK ORDER NON-CONFORMANCE / UPDATE												
											QA Closed:	Date:	•
Work Ord	er:					DISPOSITION				AGAINST D	EPARTMENT	/PROCESS	,
Part No						Rework Skid-tube Crosstube Scrap Machining Small Fab Use-as-is Thermoforming Finishing Work Order Update Large Fab Composite			Pro Rec/Sto	Engineering Quality Other			
Root					Descri	otion of work order update		Initial	Ac	tion	Sign &		
Cause		Date	Step	Qty	C	or Non-conformance	C	hief Eng	Desc	ription	Date	Verification	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training Unapproved							FAU	LT CATEC	GORY				
Landi	ng G	ear				General							_
		Bending Centre No Cracks Crushed/O Cuffs Heat Trea Inspection Ripples in	Crimped. t n Strip in Bend	Tube		Bend BOM/Route Broken/Damaged Burrs Contamination Countersink Cut Too Short Drill Holes		Instructi Mainte Mislabe Misread Offset	on Incomplete ions Incomplete/ nance led	Unclear	Ovalized Over/Under Part Incorred Part Lost/Mi Part Moved Positioned V Power Loss/	ct ssing Vrong	Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled Other
	Torque Waves in Extrusion Drawing Out of Calibration												

Out of Sequence

Outside Dimensions

DQA:

Date: ____

Turning Sequence

Wave/Twist in Tube

Finish

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Picklist Print

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Work Order ID: 92952

Parent Item:

D412-664-203

Parent Item Name: Crosstube Aft

92952

D412-664-203

Start Date: 12/11/2012

Required Date: 26/11/2012

Start Qty: 1.00

Required Qty: 1.00

**

NAS1149D0663J Purchased

Washer

MS21042L6

AN960JD616

Purchased

No

No

250

250

874.0000

0.0000

**

Nut

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Location	Loc Qty	Loc Code	
314	135		
122441	135		
ST300	239		
117677	25		
118384	3		
118927	48		
119075	4		
120308	159		Cot
ST314	500		
123248	350		
123355	150		

Each

Each

											DQA:	Date	:
NCR:	Yes	/ No				WORK ORDER NON-	CO	NFORM	MANCE / UP	DATE			•
											QA Closed:	Date	: ·
Work Ord	05.					DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	•
WORK Ord	er.					Rework	1		Skid-tube	Crosstube	1	Water Jet	Engineering
Part	Nο					Scrap	1	١,	Machining	Small Fab	Pro	d. Eng. Coor.	Quality
rare					······································	Use-as-is	1	I	noforming	Finishing	-∤	re/Packaging	Other
NCR	No.					Work Order Update	1		Large Fab	Composite	1	Supplier	1 1
Root						iption of work order update	1	Initial	Act	ion	Sign &		
Cause		Date	Step	Qty		or Non-conformance	Ct	nief Eng	Descr	iption	Date	Verification	QC Inspector
Doc/Data	<u></u>												
Equip/Tooling	_												
Operator	<u> </u>												
Material	<u></u>								•				
Setup	L												
Other	<u> </u>						l						
Process	<u> </u>			1									
Supplier	ļ				麹								
Training					<i>9</i> .								
Unapproved			1				<u>L</u>						
		<u></u>					AUI	LT CATE	GORY				
Landi	ing (1				General	_]:.		<u></u>]	Г	7
	<u> </u>	Bending			o/s	Bend	-	Grain		-	Ovalized	<u> </u>	Pressure/Forced
	-	Centre No	ot Concer	itric to	^{U/S} -	BOM/Route	\vdash	Hardwa		-	Over/Under	<u></u> ⊢	Temperature/Cure
	-	Cracks	C:		-	Broken/Damaged	\vdash	-1 `	on Incomplete		Part Incorred	} —	Weld
	_	Crushed/	Crimped.			Burrs	-	-1	ions Incomplete/U	inclear	Part Lost/Mi	ssing	Wrong Stock Pulled
	<u> </u>	Cuffs			 	Contamination	\vdash	Mainte		<u> </u>	Part Moved	M	
	<u> </u>	Heat Trea			<u> </u>	Countersink	\vdash	Mislabe		<u> </u>	Positioned V		٦٠٠٠
ł	1	Inspection	n Strip in	Tube	1	Cut Too Short	Misread			Power Loss/	Surge	Other	

Offset

Out of Calibration

Out of Sequence

Outside Dimensions

Ripples in Bend

Turning Sequence

Wave/Twist in Tube

Torque Waves in Extrusion

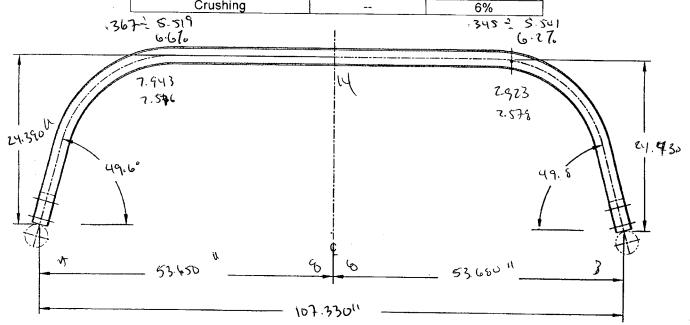
Drill Holes

Drawing

Finish

DART AEROSPACE LTD	Work Order:	92952
Description: Crosstube High Aft (412)	Part Number:	D412-664-203
Inspection Dwg: D412-664-243 Rev: E		Page 1 of 1

Min	Max
24.24	24.50
53.59	53.85
49	52
107.18	107.70
8	
	6%
	·345 = S
	6
	24.24 53.59 49



	Side A	Mippu	Side B
Bending Passes	Q	, 4	۶
Crushing	6.6%		6.27
	Commen	ts	
Sing the series Cities C	nishia @	8 PAS	う·
MIDDLE 2 14 PAS	ser-		
S. ne B 2 6:27.	60 L	DA Q DAY	ies

QC15 Inspection	DAS	
Date	16	12/4/21
	3-63	·

Rev	Date	Change	Revised by	Approved
Α	07.02.06	New Issue	KJ/JM	Approved
В	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	
С	10.02.02	Dwg Rev updated	KJ A	
D	12.04.16	Added bending, crushing dimensions	KJ 4	10

ltem	Qty -243	Part Number	Description
1	х	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D2856-600-1009	ABRASION STRIP
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTROWBELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

D

В

1) MATERIAL: MANUFACTURED FROM D6009-129

FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2 PAINT OUTSIDE PER DART QSI 005 4.2

- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: 47.0 lbs (PER IIN-D212-664)
- PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOMETHY

RELITRATIO

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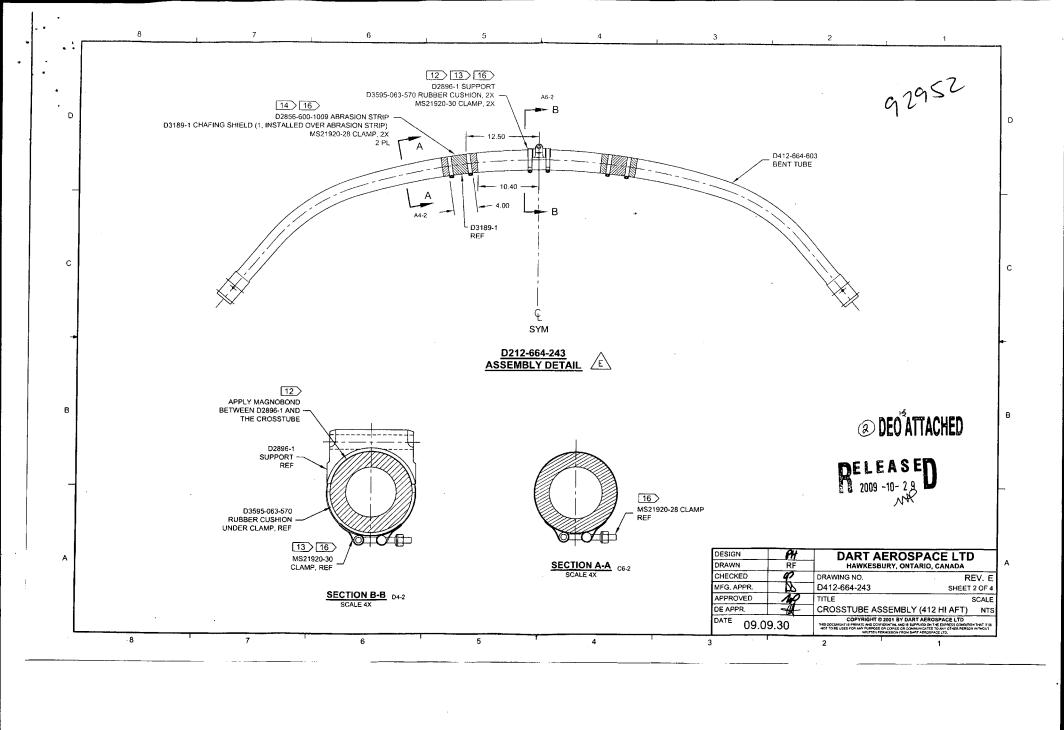
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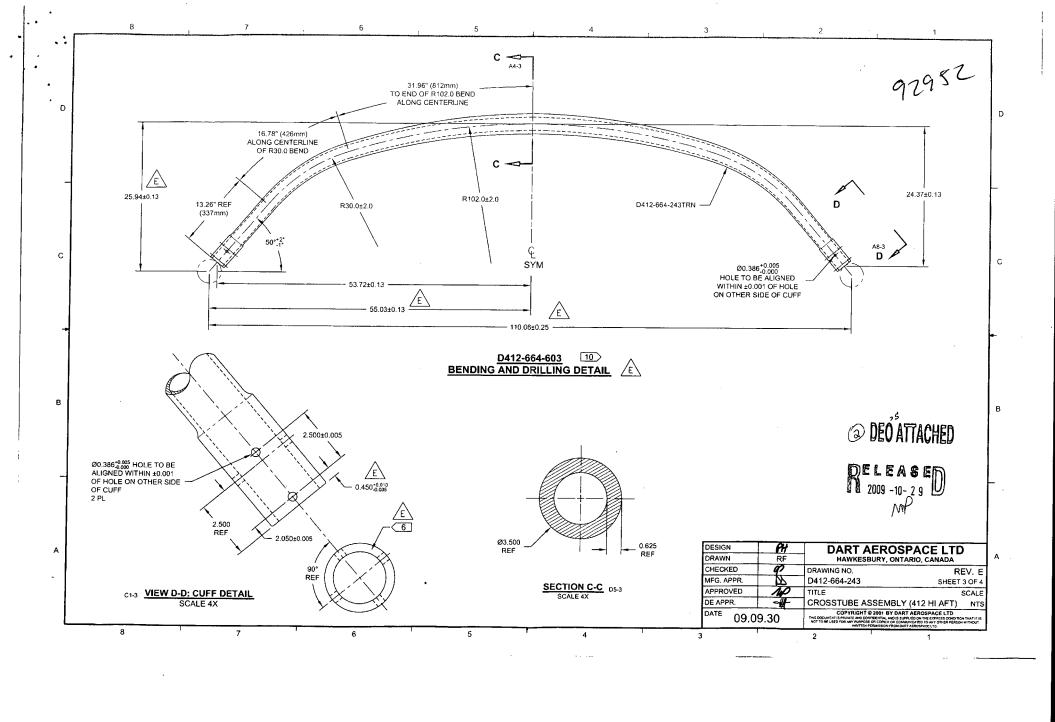
16) 9295ZMCJ

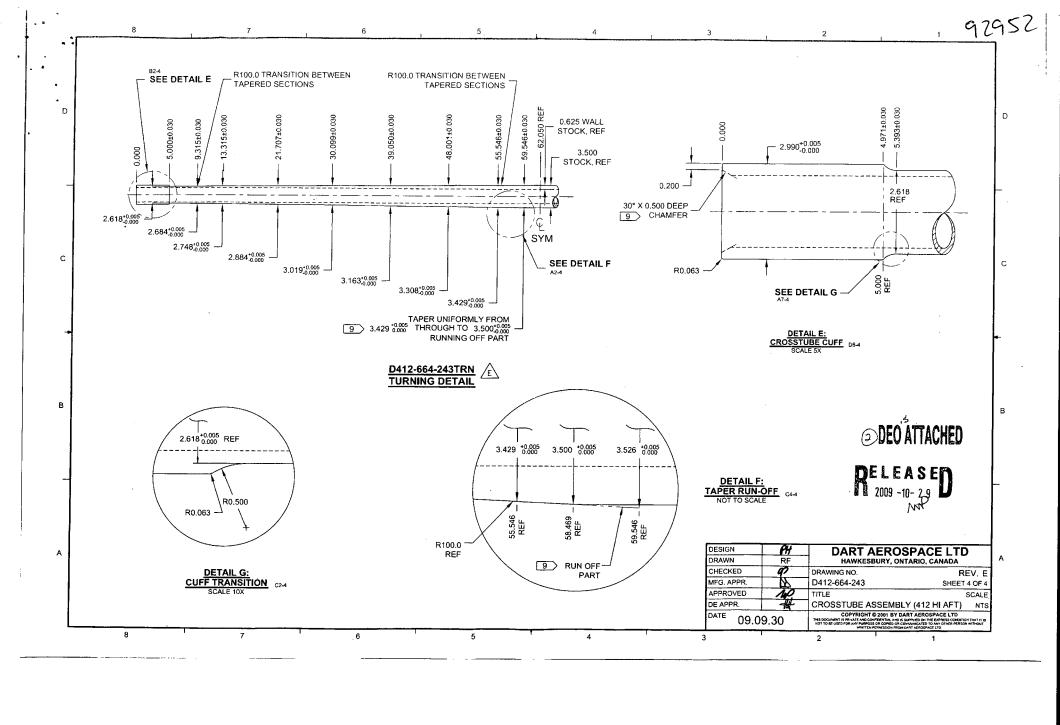
12-11-12

REFORMAT/REVISE GENERAL NOTES; 09.09.30 REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4. REMOVE D2732-058, CHANGE TO D3595-063-570 07.03.09 REMOVE D2856-600-1087, ADD D2732-058 & MB 06.10.27 MAGNOBOND 6398, MS21920-32 WAS MS21920-30 ADD HOLES FOR COMPATABILITY WITH BHT/AA 05.02.04 SKIDTUBES NEW ISSUE PH 01.10.17 REV. DESCRIPTION BY DATE

DESIGN	PH	DART AEROS	SPACE LTD
DRAWN	RF	HAWKESBURY, ON	
CHECKED	q)	DRAWING NO.	REV. E
MFG. APPR.	77	D412-664-243	SHEET 1 OF 4
APPROVED	140	TITLE	SCALE
DE APPR.	-#	CROSSTUBE ASSEMBL	Y (412 HI AFT) NTS
DATE 09 0	9.30	COPYRIGHT © 2001 BY DA	







DEALWING NO	1				···		10.
DRAWING NO.	TITLE	REV. E	DART AEROSPACE LTD	D.E.O. N	VO.	SHEET NO.	SCALE
D412-664-243	CROSSTUBE ASSEM	BLY (412 HI AFT)	ENGINEERING ORDER	D412-	664-243-E-1	SHEET 1 OF 2	NTS
DRAWN	S CHECKED	M	MFG. APPR.	APPROVED	W	DE APPR.	
,DATE 11.03	3.31 DATE	11/03.31	DATE //.03.31	DATE	11/03:31	DATE /1.03.31	

PURPOSE:

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

<u>IS:</u>

Item	Qty -243	Part Number	Description	
6	0	D2856-600-1009	ABRASION STRIP	

WAS:

6	2	D2856-600-1009	ABRASION STRIP

NOTES 2 AND 14, SHEET 1 ARE AMENDED AS FOLLOWS:

<u>IS:</u>

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA)

PAINT OUTSIDE PER DART QSI 005 4.2

AFTER PAINTING, APPLY CLEAR COAT ON HATCHED AREA

14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

WAS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

PAINT OUTSIDE PER DART QSI 005 4.2

14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.



92952 DRAWING NO. TITLE DART AEROSPACE LTD REV. E D.E.O. NO. SHEET NO. **SCALE** D412-664-243 CROSSTUBE ASSEMBLY (412 HI AFT) **ENGINEERING ORDER** D412-664-243-E₋₁ SHEET 2 OF 2 NTS CHECKED DRAWN MFG. APPR. DE APPR. **APPROVED** 11.03.31 DATE DATE 11.03.31 DATE 11-03-31 11.03.3 DATE DATE 11.03.31 IS: WAS: 14 16 < 16 < 14 Telescope | 14 Telescope | 16 Telescope | 14 Telescope | 16 Telescope | 14 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | 16 Telescope | D2856-600-1009 ABRASION STRIP D3189-1 CHAFING SHIELD (1, INSTALLED OVER PROSEAL 890) D3189-1 CHAFING SHIELD (1, INSTALLED OVER ABRASION STRIP) MS21920-28 CLAMP, 2X MS21920-28 CLAMP, 2X 2 PL D412-664-603 **BENT TUBE** D3189-1 REF D412-664-243 **ASSEMBLY DETAIL** MASK AREA PRIOR TO PAINTING AND APPLY CLEAR COAT AFTER PAINTING 2.00

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DRAWING NO			REV. E DAR	RT AEROSPACE L	TD D.E.C). NO.	SHEE"	ΓNO.	SCALE
D412-664-	243 CROSSTU	BE ASS'Y (412 HI A	(FT) ENC	GINEERING ORD	ER D41:	2-664-243 - E-2	SHEET	1 OF 1	NTS
DRAWN	P	CHECKED AS	MFG.	APPR.	APPROVE	D MP	DE APPR.	-#	
DATE	11.09.07	DATE 11.0	5.19 DATE	11.09.19	DATE	11.09.19	DATE /	1.09.19	***

PURPOSE:

REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

CHANGE:

IS:

Item	Qty -243	Part Number	Description	•
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD	

WAS:

9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023
1	'		ADHESIVE (TEXTRON/BELL SPEC. 299-947-100,
			TYPE II, CLASS 2 ADHESIVE)

NOTE 12 & 16, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.

WAS:

- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015, LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.



DRAWING D412-66		SSTUBE ASSEMB	REV. E			SHEET NO.	SCALE
DRAWN	P	CHECKED	4	MFG. APPR.	APPROVED AM	DE APPR.	NTS
DATE	12.08.21	DATE	1208.30	DATE 12.08.30	DATE 12/8/30	1 8//81	2

PURPOSE:

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890. UPDATE INSTALLATION OF CHAFING SHIELDS AND REDUCE TORQUE TO 40-50 IN-LBS. THIS ENGINEERING ORDER SUPERCEDES DEO D412-664-243-E-1.

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

IS:

ltem	Qty -243	Part Number	Description
6	- 0	D2856-600-1009	ABRASION STRIP

WAS:

6	2	D2856-600-1009	ABRASION STRIP

NOTES 2, 14, AND 16 ON SHEET 1 ARE AMENDED AS FOLLOWS:

<u> 1S:</u>

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA)
 PAINT OUTSIDE PER DART QSI 005 4.2
 AFTER PAINTING, APPLY CLEAR COAT ON HATCHED AREA
- 14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 16) TORQUE CLAMPS ON D2896-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D3189-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

WAS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2

14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.

16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

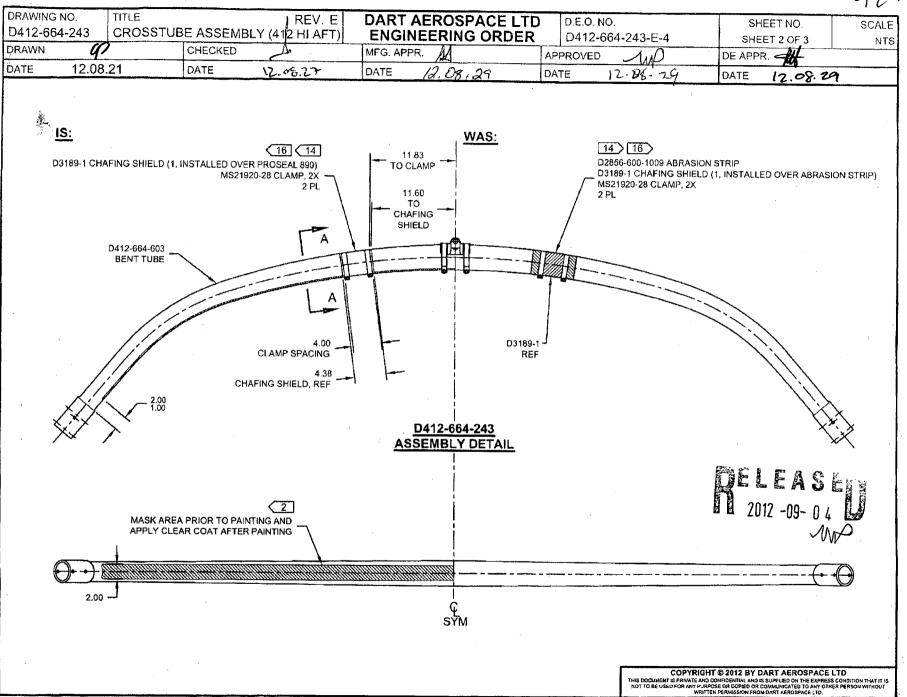


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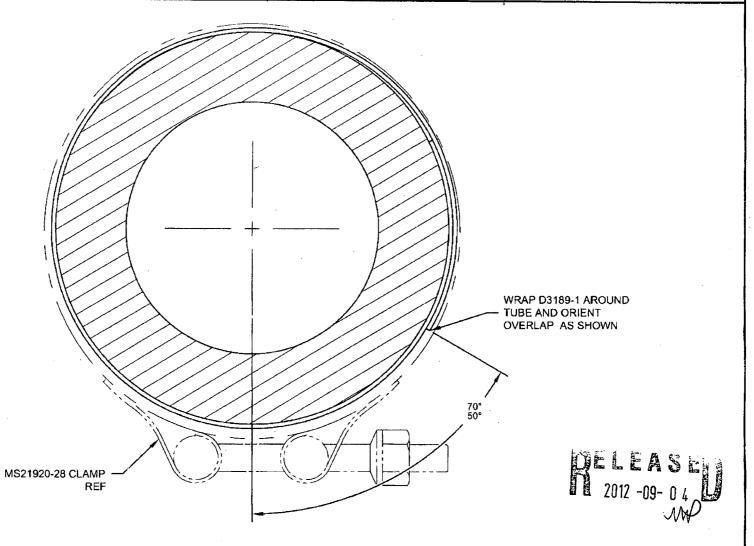
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DRAWING	NO.	TITLE		REV. E	DART AEROSPACE LT	D.E.O. NO.	SHEET NO.	SCALE
D412-66	4-243	CROSSTU	BE ASSEMBL	_Y (41⊉ HI AFT)	ENGINEERING ORDER	D412-664-243-E-4	SHEET 3 OF 3	NTS
DRAWN	<u> q</u>) 	CHECKED	فلس	MFG. APPR.	APPROVED W	DE APPR.	
DATE	12.08.	21	DATE	12.08.27	DATE 12,06,29	DATE 12.08.29	DATE 12 08.2	}



SECTION A-A
CHAFING SHIELD DETAIL VIEW ROTATED, NOT TO SCALE

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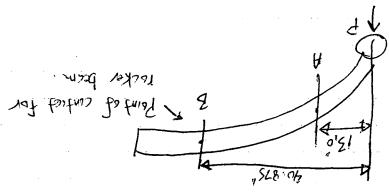
WHITTEN PERMISSION FROM DART REPOSPACE LTD.

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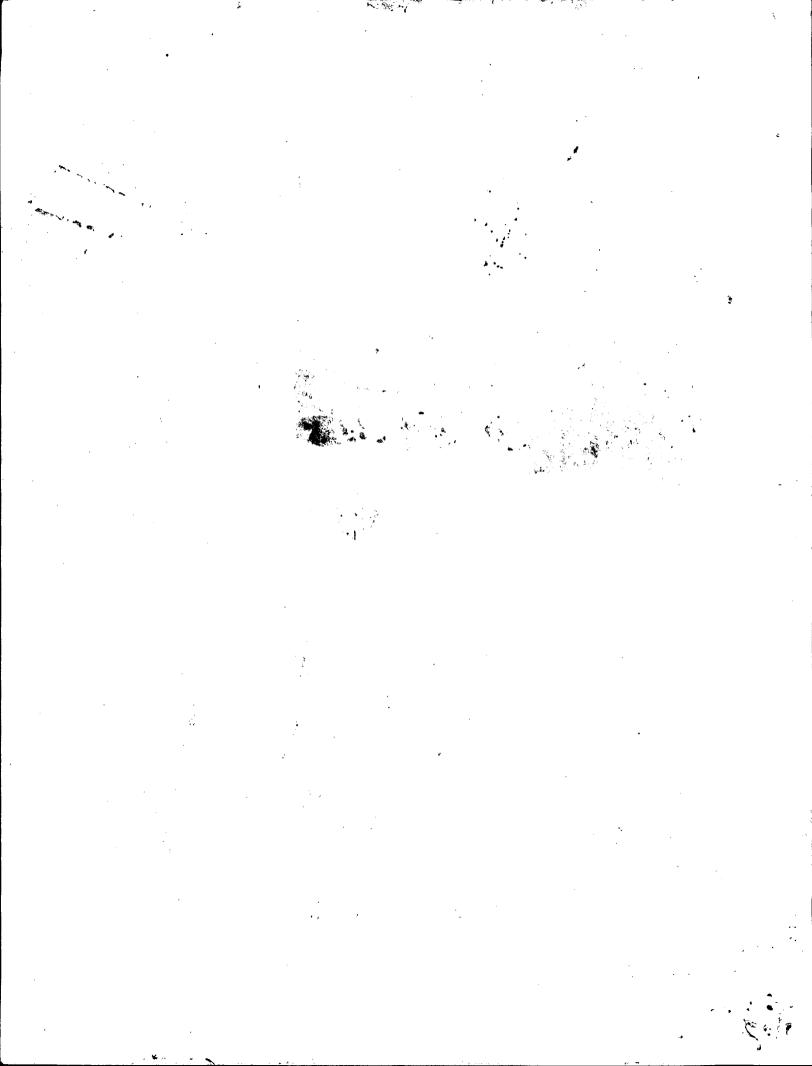
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LIQUID PENETRANT TEST REPORT

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that all descriptions, com	ments and expre.	rjorm services exten ssions of opinion ref	ids only to those services p Tect the opinions or observ	rovided for in writ vations of Acuren (ting. Under Group Inc. b	r no circumstances shall such services extended assumptions sup	end beyond the performance of to	he requested ser	vices. It is expre	essly understood
data or other information	nties. Acuren Gr n provided by Aci	oup Inc. is not assun tren Group Inc. In n	ning any responsibilities o 10 event shall Acuren Grou	of the owner/operate Ap Inc.'s liability in	or and the	pased on information and assumptions sup owner/operator retains complete responsib the services referred to herein exceed the a	bility for the engineering, manuf	acture, repair a	u nor can iney o rd use decisions	e construea as as a result of the
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CLIENT REPRESE	ENTATIVE .	Andy :	Sheldon		Al	heldon	DTR#	E- /	207	-25-
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